What is Claimed is:

1. A method of processing a digital data array *S*, the method comprising:

locating maximum and minimum sample values, max and min, within a local window *W* of *S*, the window containing a sample *s*;

defining an edge deflection value *ed* having a value between max and min, inclusive;

when *s* has a value lower than *ed*, calculating a negative diffusion quantity *d* based on the position of the value for *s* between *ed* and min;

when *s* has a value greater than *ed*, calculating a positive diffusion quantity *d* based on the position of the value for *s* between *ed* and max; and

forming an adjusted sample *s'* by adding *d* to *s*.

2. The method of claim 1, wherein:

the negative diffusion quantity *d* is calculated as

$$d = \alpha \frac{(s - \min)(s - ed)}{\max - \min}; \text{ and}$$

the positive diffusion quantity *d* is calculated as

$$d = \alpha \frac{(\max - s)(s - ed)}{\max - \min}$$

3. The method of claim 2, wherein $\alpha = 1$.

4. The method of claim 2, wherein defining *ed* comprises setting

$$ed = \min + ec(\max - \min), \text{ where } 0 < ec < 1.$$

5. The method of claim 4, wherein $c = 0.5$.

6. The method of claim 1, wherein the digital data array S is a two-dimensional image, further comprising forming a filtered image S' from an original image S having M rows and N columns, by stepping through all combinations of i and j, $0 \leq i < M$ and $0 \leq j < N$, and for each combination of i and j:

defining $s = S(i,j)$;

defining W to include all samples $S(k,l)$ for which $i - w \leq k \leq i + w$ and $j - w \leq l \leq j + w$, subject to k and l addressing a valid row and column of S;

completing the steps of claim 1 to arrive at an s' for s and W; and

setting $S'(i,j) = s'$.

7. The method of claim 6, wherein w is selected as a constant for all values of i and j, and wherein w is selected from the group of integers consisting of 1, 2, and 3.

8. The method of claim 6, further comprising selecting a number of iterations K, $K > 1$, and for each iteration:

performing the steps of claim 6 on S to form an image S'; and

setting $S = S'$.

9. The method of claim 6, further comprising blurring S prior to performing the steps of claim 6.

10. The method of claim 9, wherein blurring S comprises filtering S using a Perona-Malic de-ring filter.

11. An apparatus for processing a digital data array, comprising:

means for identifying the maximum and minimum sample values, max and min, occurring within a supplied window of the data array, the supplied window including a sample *s*;

means for selecting an edge deflection value *ed* having a value between max and min, inclusive;

means for calculating a diffusion quantity *d*, based on the position of the value for *s* between *ed* and min when *s* has a value lower than *ed*, and based on the position of the value for *s* between *ed* and max when *s* has a value greater than *ed*; and

means for calculating an adjusted sample *s'* representing $d + s$.

12. The apparatus of claim 11, wherein the means for selecting an edge deflection value *ed* comprises digital circuitry for calculating a quantity

$$ed = \min + ec(\max - \min), \text{ where } 0 < ec < 1.$$

13. The apparatus of claim 12, wherein the digital circuitry comprises an adder for calculating max + min as a binary value, and a shifter connected to the adder output to shift the adder output one bit right.

14. The apparatus of claim 11, wherein the means for calculating a diffusion quantity *d* comprises:

a first adder to calculate $s - ed$;

a second adder to calculate $\max - s$;

a third adder to calculate $s - \min$;

a 2:1 multiplexer to select as its output either the output of the second or the third adder, based on the sign of the output of the first adder;

a multiplier to multiply the output of the multiplexer by the output of the first adder; and

a scaler to scale the output of the multiplier to a value *d*.

15. The apparatus of claim 14, wherein the scaler divides the output of the multiplier by the value (max – min).

16. An article of manufacture comprising a computer-readable medium containing executable or interpretable instructions for a processor, the instructions, when executed by the processor with input from a digital data array *S*, performing the steps of:

locating maximum and minimum sample values, max and min, within a local window *W* of digital data array *S*, the local window containing a sample *s*;

defining an edge deflection value *ed* having a value between max and min, inclusive;

when *s* has a value lower than *ed*, calculating a negative diffusion quantity *d* based on the position of the value for *s* between *ed* and min;

when *s* has a value greater than *ed*, calculating a positive diffusion quantity *d* based on the position of the value for *s* between *ed* and max; and

forming an adjusted sample *s'* by adding *d* to *s*.

17. The article of manufacture of claim 16, wherein the executable instructions perform the recited steps for each sample *s* in *S*.

18. The article of manufacture of claim 17, wherein the executable instructions include instructions for iterating the recited steps on the data array *S* a selectable number of iterations.

19. The article of manufacture of claim 17, wherein the executable instructions contain instructions for low-pass and/or de-ring filtering *S* prior to performing the recited steps of claim 17.

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